

REMARKS

Claims 30, 40, 41, 43, 48 and 49 have been amended. Claims 30-44, 46 and 48-49 remain pending. Applicant reserves the right to pursue the original claims and other claims in this and other applications. Please reconsider the above-referenced application in light of the amendments and foregoing remarks.

The Amendment filed on December 8, 2005 is objected to with regard to claims 30 and 43 under 35 U.S.C. § 132 (new matter). The Office Action asserts that “[t]he specification lacks **explicitly** teachings for supporting” “the feature of “unpatterned substrate”” (p. 2). The objection is respectfully traversed.

Applicant submits that the specification provides explicit and literal support for the amendment “wherein said transparent substrate remains unpatterned” in claim 30 and the amendment “unpatterned substrate” in claim 43. In support of these claim amendments, Applicant respectfully directs the Examiner’s attention to the embodiments illustrated in FIGS. 16A-16F, FIGS. 19A-19H, and the corresponding text for FIGS. 16A-16F and 19A-19H. For example, in FIG. 16C, photoresist mask 96a comprising a periodic grating pattern is formed *only* on birefringence layer 93. Then, the “unmasked portions of the birefringence layer 93 are removed by etching as shown in FIG. 16D.” (Applicant’s specification, pg. 59, line 24 through pg. 60, line 2). Mask 96a is then removed (FIG. 16E) and an isotropic overcoat layer 94 is formed.

As FIGS. 16A-16F illustrate, the transparent substrate 92 is *not* patterned *when the birefringence layer 93 is patterned with the periodic grating pattern* (FIG. 16D). This can clearly be seen by comparing the substrate 92 as represented throughout the process in FIGS. 16A-16F, in which the size and shape of the substrate 92 does not change, thus **explicitly** teaching that the substrate is not patterned. Similarly, in FIGS. 19A-19H, the transparent substrate 92 is *not* patterned; but, *only the birefringence layer 93*

is patterned (FIG. 19G). As a result, Applicant's specification and illustrations explicitly support the amendments "wherein said transparent substrate remains unpatterned" in claim 30 and "unpatterned substrate" in claim 43. The drawings are part of the original disclosure.

Alternatively, even if the Examiner maintains that the specification does not explicitly support claims 30 and 43 as amended, Applicant respectfully submits that "[a]dequate description under the first paragraph of 35 U.S.C. 112 does not require literal support for the claimed invention." *Ex parte Parks*, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993) (citing *In re Herschler*, 591 F.2d 693, 200 USPQ 711 (CCPA 1979); *In re Edwards*, 568 F.2d 1349, 196 USPQ 465 (CCPA 1978); *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976)). "Rather, it is sufficient if the originally-filed disclosure would have conveyed to one having ordinary skill in the art that an appellant had possession of the concept of what is claimed." *Id.* (citing *In re Anderson*, 471 F.2d 1237, 176 USPQ 331 (CCPA 1973)). The Board of Patent Appeals went on to say that "[c]learly, the observation of a lack of literal support does not, in and of itself, establish a *prima facie* case for lack of adequate descriptive support under the first paragraph of 35 U.S.C. 112." *Id.*

In the present application, it is clear that the originally-filed disclosure would have conveyed to one having ordinary skill in the art that the Applicant had possession of the concept that "said transparent substrate remains unpatterned" and an "unpatterned substrate" as recited in claims 30 and 43, respectively, for the reasons discussed above.

The Amendment filed on December 8, 2005 is also objected to and rejected with regard to claims 48 and 49 under 35 U.S.C. § 132 and 35 U.S.C. § 112, respectively (new matter). The Office Action asserts that "[t]he specification fails to give explicit

support for" "the phrase "wherein a top surface portion of the substrate is exposed" "and fails to teach what exactly is this top portion being exposed to." The objection is respectfully traversed.

Applicant submits that the specification provides explicit and literal support for the amendments "wherein a top surface portion of the substrate is exposed" and "and on said exposed portion of the top substrate" in claims 48 and 49, respectively. In support of these claim amendments, Applicant respectfully directs the Examiner's attention to the embodiments illustrated in FIGS. 16D-16E, FIGS. 19F-19G, and the corresponding text for FIGS. 16E-16E and 19F-19G. For example, Applicant's specification recites that "[a] known dry etching, such as sputter etching, is performed, and unmasked portions of the birefringence layer 93 are removed by etching as shown in FIG. 16D." (Applicant's specification, pg. 59, line 24 through pg. 60, line 2). FIGS. 16D and 16E clearly show that the substrate 92 is "exposed" between the gaps in the birefringence layer 93. In claims 48 and 49, the term "exposed" is given its plain meaning which is "uncovered". As shown in FIGS. 16D-16E and FIGS. 19F-19G, the substrate 92 is explicitly taught as being "uncovered" when viewed from above along the x-axis. Therefore, it is clear that Applicant's specification and illustrations explicitly support the amendments "wherein a top surface portion of the substrate is exposed" and "and on said exposed portion of the top substrate" in claims 48 and 49, respectively.

Alternatively, even if the Examiner maintains that the specification does not explicitly support claims 48 and 49 as amended, Applicant respectfully directs the Examiner's attention to the discussion above, which makes it plain that adequate description under the first paragraph of 35 U.S.C. 112 does not require literal support for the claimed invention. In the present application, it is clear that the originally-filed disclosure conveyed to one having ordinary skill in the art that the Applicant had

possession of the concepts of “wherein a top surface portion of the substrate is exposed” and “and on said exposed portion of the top substrate” in claims 48 and 49, respectively, for the reasons discussed above.

Claims 30-46 and 48 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

The rejection is respectfully traversed. Claims 30, 40-41, 43, and 48-49 have been amended to obviate the Examiner’s concerns. The terms “incident reflection” and “incident” have been removed where they modified the term “beam”.

Claims 30-44, 46, and 48-49 are objected to because of informalities cited by the Office Action. The objections are respectfully traversed. Claims 30, 40-41, 43, and 48-49 have been amended to obviate the Examiner’s objections. The phrase “received from an optical disk” has been removed from claim 30. The terms “incident reflection” and “incident” have been removed from claims 30, 40-41, 43, and 48-49 where they modified the term “beam”. The phrase “the reflection beam” has been amended to read “a beam” in claim 48.

The amendments “wherein a top surface portion of the substrate is exposed” and “and on said exposed portion of the top substrate” in claims 48 and 49, respectively have not been amended. Applicant respectfully submits that in claims 48 and 49, the term “exposed” is given its plain meaning which is “uncovered” as discussed above in greater detail. Therefore, the claims are neither confusing nor indefinite.

Further, Applicant respectfully submits that the phrase “forming an isotropic overcoat over said patterned uni-directionally stretched organic polymer layer and on said exposed portion of the top substrate” in claims 48 and 49 is not indefinite. The meaning of the phrase can be ascertained by its plain meaning or with reference to the

example given in FIGS. 16F or 19H in which it can be seen that an isotropic overcoat 94 has been formed over the patterned uni-directionally stretched organic polymer layer 93 and on the exposed portion of the top substrate 92.

Claims 30-32 and 35-42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,739,952 ("Takeda I") in view of U.S. Patent No. 5,244,713 ("Nakamura") and U.S. Patent No. 5,793,733 ("Takeda II"). The rejection is respectfully traversed.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

With regard to claim 30, the Office Action fails to make a *prima facie* case of obviousness because there is no proper suggestion or motivation to combine Nakamura with Takeda I. The Office Action states that the motivation to "use the well-known heating and uniaxial stretching method and the well known organic polymer materials" of Nakamura in the method taught by Takeda I would be "for the benefit of using a manufacture method to obtain *optimum* birefringence of the film, and to cut manufacturing cost by using conventionally accessible and known polymer materials." Applicant respectfully disagrees.

Takeda I teaches a method of orienting a polydiacetylene film by rubbing in one direction (column 8, lines 20-23). Takeda I gives no indication that the birefringence of the film achieved by this method is less than optimal. Furthermore, Takeda I states that "the polydiacetylene film can be provided with in-plane orientation by merely rubbing the film in one direction" and that this process "contribute[s] to easy fabrication of the polarizing beam splitter" (column 8, lines 42-48). Therefore, there would be no suggestion or motivation to substitute the more difficult and labor intensive process of Nakamura for the "easy" fabrication method taught by Takeda I.

Furthermore, with regard to the polymer used, Takeda I teaches using an "oriented polydiacetylene film" in a sophisticated piece of equipment such as an optical device, because polydiacetylene 1.) "is inherently small in the temperature dependency of refractive index and hence, it contributes to enhancement in the environmental resistance of the polarizing beam splitter," 2.) "has inherently high crystallinity and hence contributes to uniformity in the characteristics of the polarizing beam splitter," and 3.) has the "ability to cause a great degree of birefringence and, hence, it can be formed in a sufficiently small thickness to realize a compact polarizing beam splitter" (column 7, line 66 to column 8, line 8). Therefore, there would be no suggestion or motivation to substitute an inferior polymer taught by Nakamura for the specialized polymer, polydiacetylene, taught by Takeda I merely "to cut manufacturing cost by using conventionally accessible and known polymer materials."

Further, with regard to claim 30, the Office Action fails to make a *prima facie* case of obviousness because there is no reasonable expectation of success by combining Nakamura with Takeda I. Takeda I teaches using an "oriented polydiacetylene film" in a sophisticated piece of equipment such as an optical device for the specific reasons discussed above. Neither Takeda I nor Nakamura provide a reasonable expectation

that substituting a common polymer taught by Nakamura with the polarizing beam splitter of Takeda I would produce a successful polarizing beam splitter.

Claims 31-32 and 35-42 depend from claim 30, and should be allowable for at least the reasons provided above, and on their own merits.

With regard to claim 35, The Office Action acknowledges that Nakamura discloses a heat-stretching process conducted at a temperature between 190 to 230°C (Office Action, p. 7), and concludes that it would be an obvious modification to use a temperature of 350°C. Applicant respectfully submits that this is *not* the proper standard for setting forth a *prima facie* case of obviousness. See M.P.E.P. § 2144.05. Nakamura discloses a temperature that is *at least 120°C cooler* than Applicant's claimed temperature in forming the birefringence layer, *i.e.*, 350°C. There is no evidence that the temperatures are close enough that one skilled in the art would believe them to have the same properties. There is a significant difference between the temperatures at which the two birefringence films are formed. Further, Applicant's claimed temperature of 350°C does *not* lie within Nakamura's disclosed range. Accordingly, a *prima facie* case of obviousness has not been established.

With regard to claims 37-39, the Office Action acknowledges that the cited references "do not teach explicitly to have the particular values claimed in the claims." (Office Action, p. 8). Applicant respectfully submits that the cited references do not teach or disclose *any* refractive indices which are close to Applicant's cited refractive indices. Again, a *prima facie* case of obviousness has not been properly set forth. See M.P.E.P. § 2144.05.

With regard to claim 37, the cited references do not disclose or suggest "a refractive index . . . in said one direction of stretching is about 1.62," as recited in claim 37.

With regard to claim 38, the cited references do not disclose or suggest that "the refractive index for said organic polymer material in a direction *perpendicular* to said one direction of stretching is about 1.49." The cited references do *not* disclose or suggest the refractive index for a birefringent film in a perpendicular direction.

With regard to claims 40 and 41, the Office Action manipulates equations 26 and 28 (Takeda I, column 14, lines 20-37). However, Applicant respectfully submits that the equations taught by Takeda I as manipulated by the Office Action are not equivalent to the equations of claims 40 and 41 and that the Office Action contains an error in the manipulation of equations 26 and 28.

For example, the Office Action states that:

"OPD(o) = 2mπ = (n_o-n_c)*d2*k which gives (n_o-n_c)d2 = mλ"

However, Takeda I teaches that $k = \lambda/2\pi$ (column 14, line 3). Substituting k into the equation "OPD(o) = 2mπ = (n_o-n_c)*d2*k" yields:

$$OPD(o) = 2m\pi = (n_o - n_c) * d2 * \lambda/2\pi$$

Multiplying both sides by 2π then yields:

$$OPD(o) = 4m\pi^2 = (n_o - n_c) * d2 * \lambda$$

This equation cannot be reduced to " $(n_o - n_c) * d2 * k$ " as stated by the Office Action and is not equivalent to the equations required by claims 40 and 41. Therefore, Takeda I does not teach the limitations of claims 40 and 41.

With regard to claim 42, the Office Action acknowledges that the cited references "do not teach explicitly to use spin coating for applying the organic polymer to the substrate." (Office Action, p. 9). The Office Action states that such a modification would have been obvious, however, this unsupported statement alone cannot serve to set forth a *prima facie* case of obviousness. *See M.P.E.P. § 2144.05.*

Claims 43-45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takeda I in view of Nakamura. Applicant respectfully notes that claim 45 was canceled in the July 12, 2005 Amendment. The rejection is respectfully traversed. With regard to claim 43, Applicant respectfully submits that the Office Action fails to make a *prima facie* case of obviousness for the same reasons as given above with regard to claim 30. Claims 44 and 46 depend from claim 43, and should be allowable for at least the reasons provided above, and on their own merits.

Claims 33-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takeda I, Nakamura, Takeda II, and further in view of U.S. Patent No. 5,245,456 ("Yoshimi") and U.S. Patent No. 6,040,418 ("Yamamoto"). The rejection is respectfully traversed. Claim 33 depends from independent claim 30 and claim 34 depends from claim 33. For at least the reasons provided above regarding claim 30, claims 33 and 34 should be similarly allowable with claim 30 for at least the reasons provided above with regard to claim 30.

Claims 48 and 49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Iwatsuka in view of Nakamura. The rejection is respectfully

traversed. Claims 48 and 49 have been amended to recite a method of forming a polarization hologram comprising, *inter alia*, “forming a periodic grating pattern on [a] uni-directionally stretched organic polymer layer with [a] photoresist mask, *wherein a top surface portion of the substrate is exposed*; removing said photoresist mask; and *forming an isotropic overcoat over* said patterned uni-directionally stretched organic polymer layer *and on said exposed portion of the top surface of the substrate.*” (emphasis added).

Iwatsuka does not disclose or suggest exposing a top surface portion of the substrate *and* forming an isotropic overcoat over the exposed portion of the top surface. For instance, in FIGS. 2(A)-2(E), Iwatsuka teaches that a birefringence layer 2 is formed on glass substrate 1. A mask 3 is then formed on the birefringence layer 2 (FIG. 2(B)). The birefringence layer 2 is then etched using mask 3 (FIG. 2(C)). The birefringence layer 2 is *not* completely etched to expose a top portion of substrate 1. Next, an isotropic dielectric film 4 is formed over the birefringence layer 2; but, is *not* formed *on* the exposed portion of the top surface of the substrate (FIG. 2(E)). In fact, it is impossible for this step to occur since Iwatsuka does not disclose or suggest exposing a top surface of substrate 1. Nakamura is relied upon for disclosing a uniaxially stretched birefringence film and adds nothing to rectify the deficiencies associated with Iwatsuka.

The Office Action states that the Examiner is examining claims 48 and 49 “as the top surface portion is exposed to the organic polymer layer.” However, as discussed above, this interpretation of the word “exposed” is incorrect. The word “exposed” as used in claims 48 and 49 should be given its common definition, which is “uncovered”. Therefore, it is clear that Iwatsuka does not teach a substrate that is exposed, but instead teaches a substrate that is covered by an isotropic dielectric film 4 (FIG. 2(E)).

Further, claim 48 recites that “the polarization hologram is configured to substantially satisfy the following requirements: $(np-n1)h=mL$; $(ns-n1)h=(m\pm\frac{1}{2})L$; where np is a refractive index of the birefringence layer for a p-polarized light of the reflection beam, ns is a refractive index of the birefringence layer for an s-polarized light of the reflection beam, $n1$ is a refractive index of an isotropic overcoat layer, h is a depth of the periodic grating pattern, L is a wavelength of the reflection beam, and m is an integer ($m=0, \pm 1, \pm 2, \dots$).” Iwatsuka does not teach or suggest Applicant’s claimed relationship.

Iwatsuka teaches a polarizer that satisfies the computational relations set forth in column 4, lines 10-40. When the relations are satisfied, Iwatsuka discloses that “the incident-ray polarized light components indicating refractive indexes $n1^+$, $n2^+$ interfere with each other for intensification as they pass through the polarizer, whereas the incident-ray polarized light components indicating refractive indexes $n1^-$, $n2^-$ weaken each other by mutual interference as they pass through the polarizer.” (Col. 4, ll. 40-47). As a result, “[i]n the end, only the polarized light components in the + direction can be taken out.” (Col. 4, ll. 47-49). Applicant’s disclosed formulation *does not* take out the polarized light components in the +direction; but, rather, uses the parallel and perpendicular refractive indexes in combination to form the polarization hologram.

The Office Action has stated that “the equations of Iwatsuka et al have to satisfy the claimed relationship since the polarization hologram disclosed by the Iwatsuka et al does diffract the polarized light in the **same way** as the instant application namely only the (+) polarization component or the p-polarization component will be diffracted out by the polarization hologram.” Applicant respectfully disagrees with this characterization. The disclosure of Iwatsuka does not diffract polarized light in the same way as claimed in claim 48, because Applicant’s disclosed

formulation *does not* take out the polarized light components in the +direction; but, rather, uses the parallel and perpendicular refractive indexes in combination to form the polarization hologram. Therefore, the equations taught by Iwatsuka cannot be assumed to be equivalent to the equations of claim 48.

Moreover, there is no motivation to combine Iwatsuka and Nakamura to optimize the birefringence as the Office Action asserts. Iwatsuka specifically discloses that the polarizer must conform to the relations provided; and thus, there is no motivation to use a uniaxially stretched birefringence film to optimize birefringence. The optimized birefringence is already provided with Iwatsuka's specific computational formula.

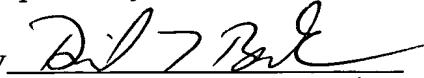
Claims 43-44 and 46 stand rejected under the judicially created doctrine of obviousness type double-patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,618,344 ("Funato"). The rejection is respectfully traversed. Applicant respectfully submits that the claims of the present application recite important limitations that are not obvious over the claims of Funato. For instance, claim 1 of Funato recites an *optical pickup apparatus* with "a birefringence layer of a stretched organic polymer material." Claims 2-9 of Funato depend from claim 1.

Claim 43 of the present application, in contrast, defines a *polarization hologram* structure and recites "a uni-directionally stretched birefringence layer with a periodic grating pattern comprising organic polymer material affixed to said *unpatterned* substrate . . . wherein the depth of said periodic grating pattern is essentially equal to a thickness of said uni-directionally stretched birefringence layer." (emphasis added). Claim 1 of Funato does not disclose that the depth of the periodic grating pattern is essentially equal to a thickness of a uni-directionally stretched birefringence layer, much less an *unpatterned* substrate.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to review and pass this application to issue.

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Respectfully submitted,

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